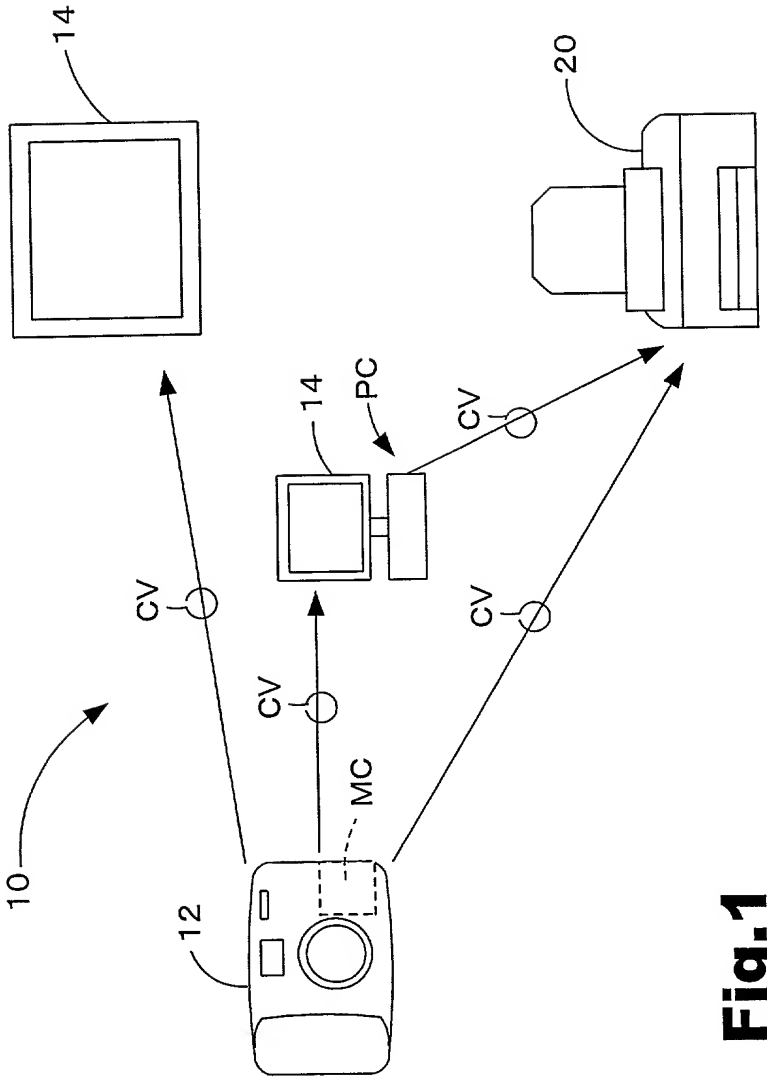

Fig.1

Fig.2

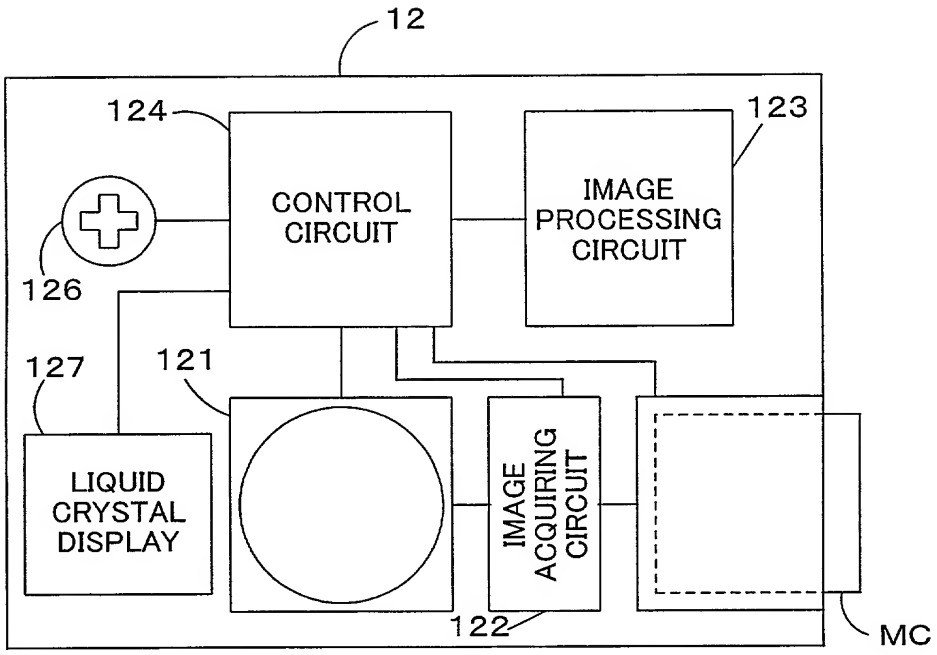
12
124
123
CONTROL CIRCUIT
IMAGE PROCESSING CIRCUIT
126
127
121
LIQUID CRYSTAL DISPLAY
IMAGE ACQUIRING CIRCUIT
122
MC

Fig.3

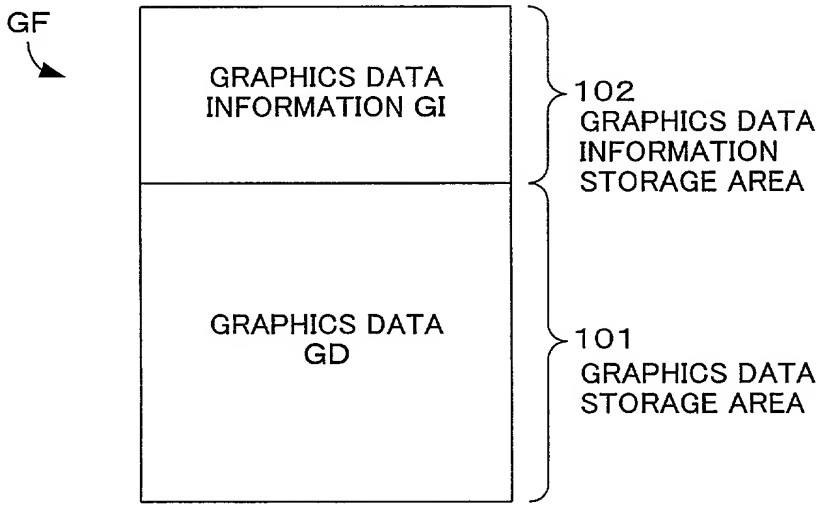
GF
GRAPHICS DATA INFORMATION GI
GRAPHICS DATA GD
102
GRAPHICS DATA INFORMATION STORAGE AREA
101
GRAPHICS DATA STORAGE AREA

Fig.4

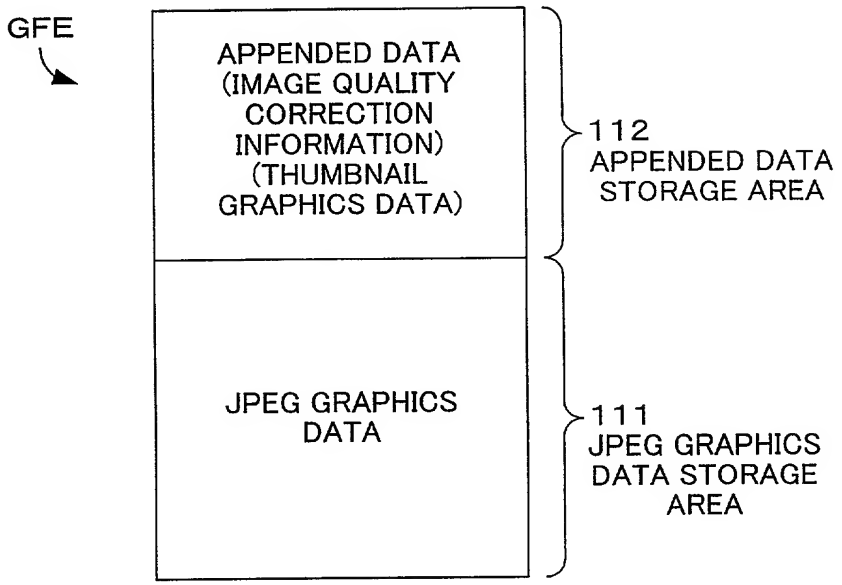

Fig.5

TAG NAME	PARAMETER VALUE
EXPOSURE TIME	1/137 SEC
LENS F NUMBER	F10. 1
EXPOSURE BIAS VALUE	EV0. 4
MIN. F VALUE	F2. 0
LENS FOCAL DISTANCE	20. 70(mm)
COLOR SPACE INFORMATION	sRGB
PICTURE MODE	1
AUTO ADJUST LEVEL	5
⋮	⋮

112 APPENDED DATA STORAGE AREA

Fig.6

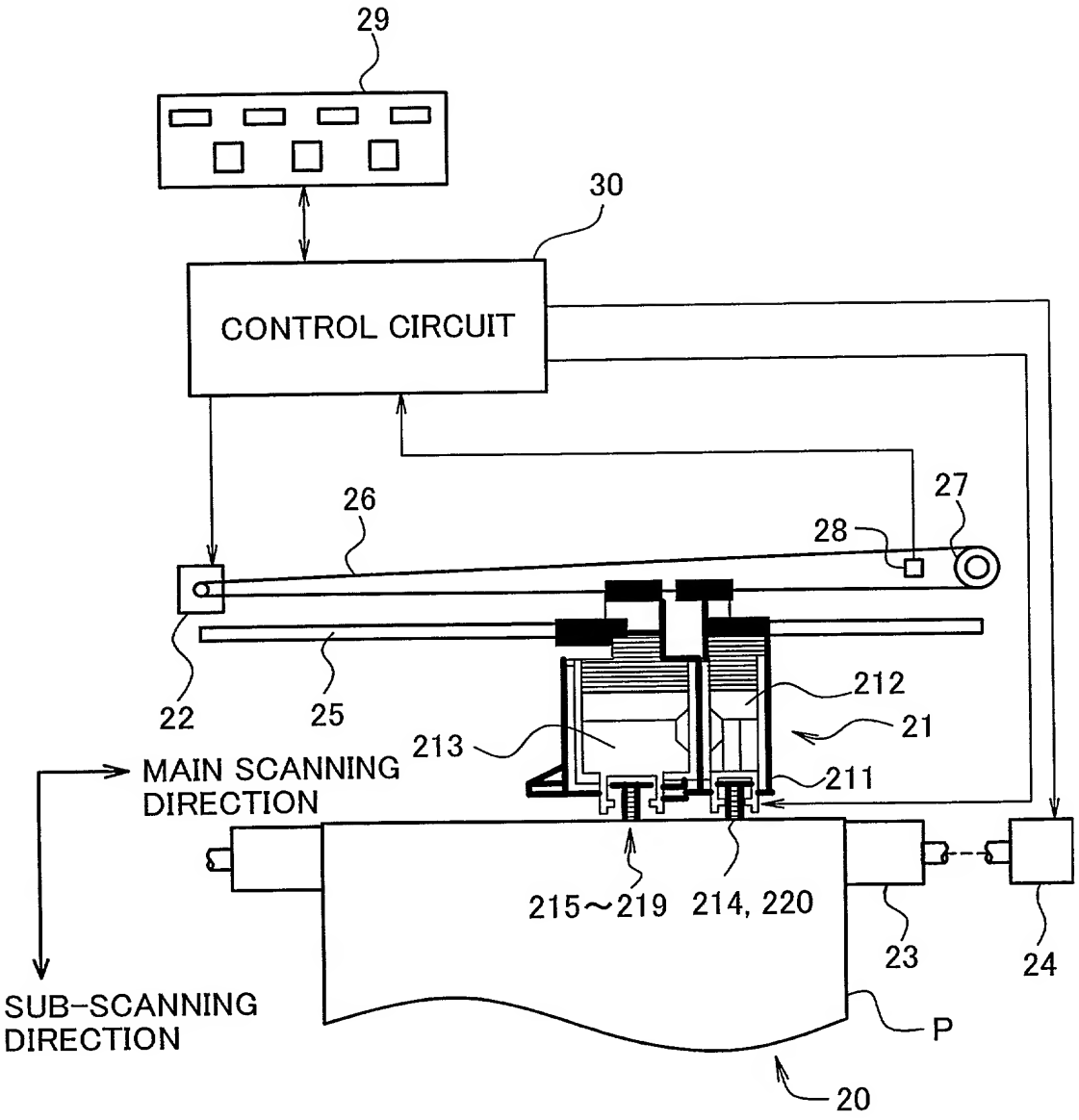
29
30
CONTROL CIRCUIT
26
27
28
22
25
212
21
213
211
MAIN SCANNING
DIRECTION
215～219
214, 220
23
24
SUB-SCANNING
DIRECTION
P
20

Fig.7

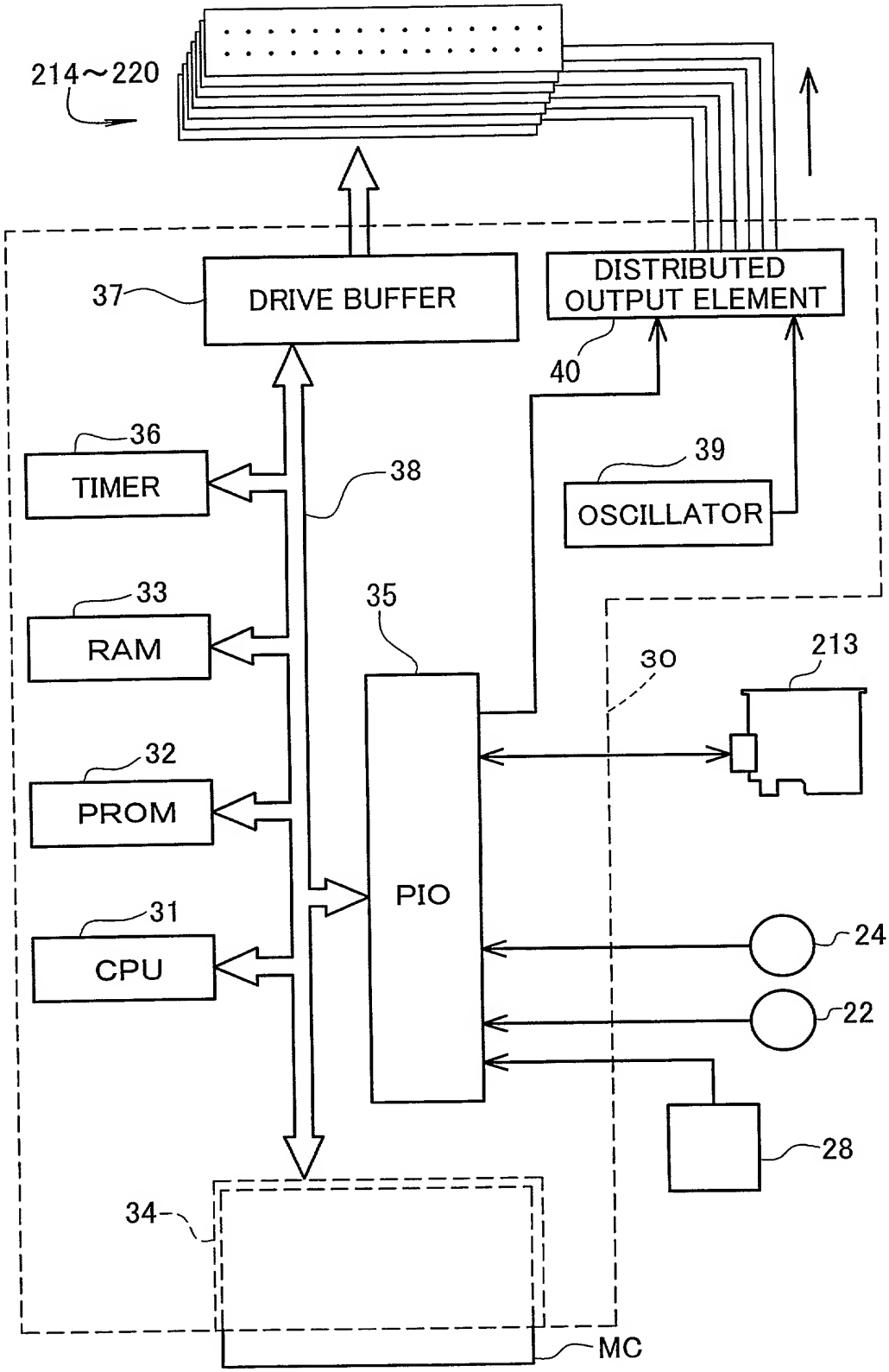
214～220
37
DRIVE BUFFER
DISTRIBUTED OUTPUT ELEMENT
40
36
TIMER
38
39
OSCILLATOR
33
RAM
35
30
213
32
PROM
PIO
31
CPU
24
22
28
34
MC

Fig.8

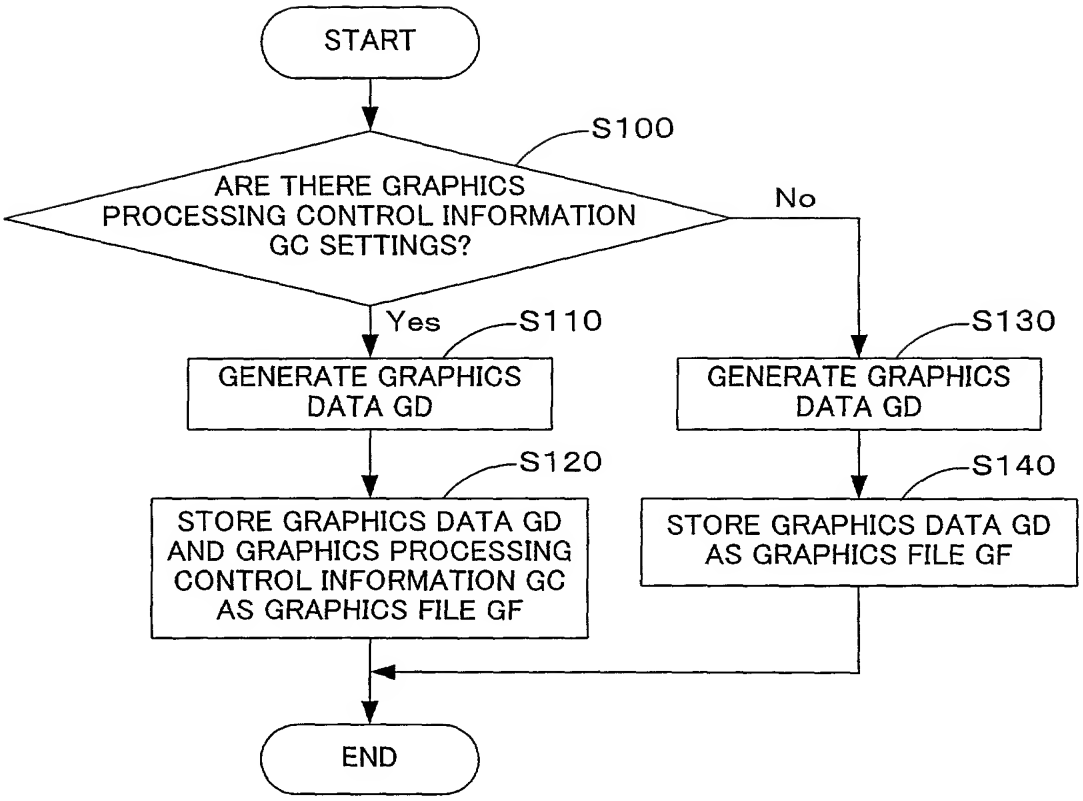
START
S100
ARE THERE GRAPHICS PROCESSING CONTROL INFORMATION GC SETTINGS?
No
Yes
S110
GENERATE GRAPHICS DATA GD
S120
STORE GRAPHICS DATA GD AND GRAPHICS PROCESSING CONTROL INFORMATION GC AS GRAPHICS FILE GF
S130
GENERATE GRAPHICS DATA GD
S140
STORE GRAPHICS DATA GD AS GRAPHICS FILE GF
END

Fig.9

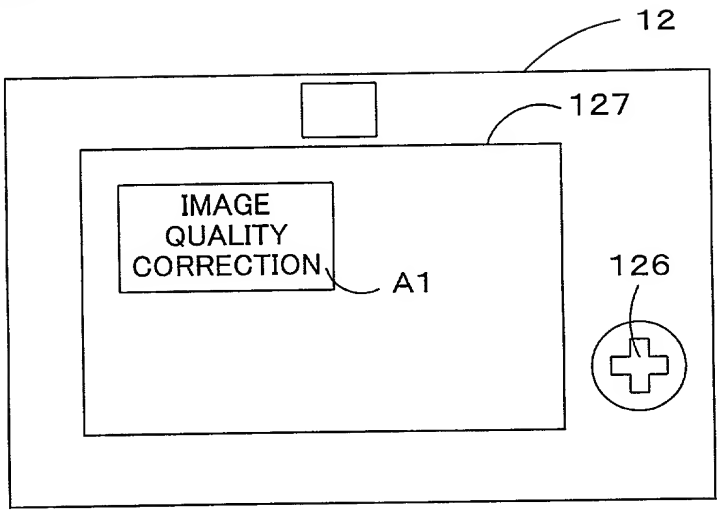
12
127
IMAGE
QUALITY
CORRECTION
A1
126

Fig.10

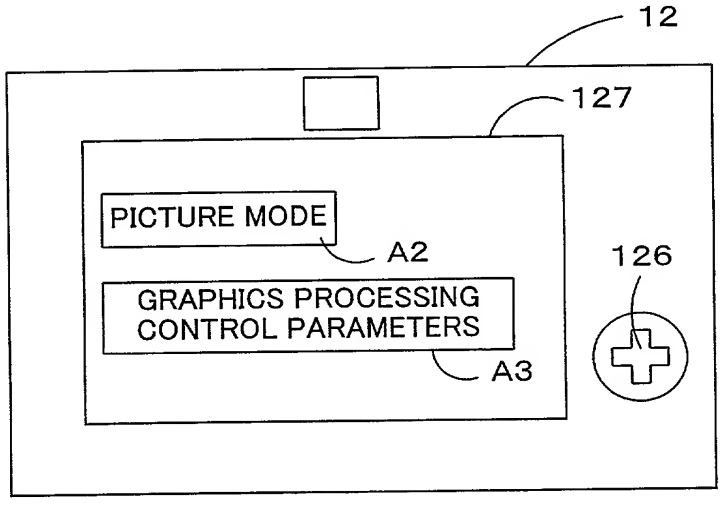
12
127
PICTURE MODE
A2
GRAPHICS PROCESSING
CONTROL PARAMETERS
A3
126

Fig.11

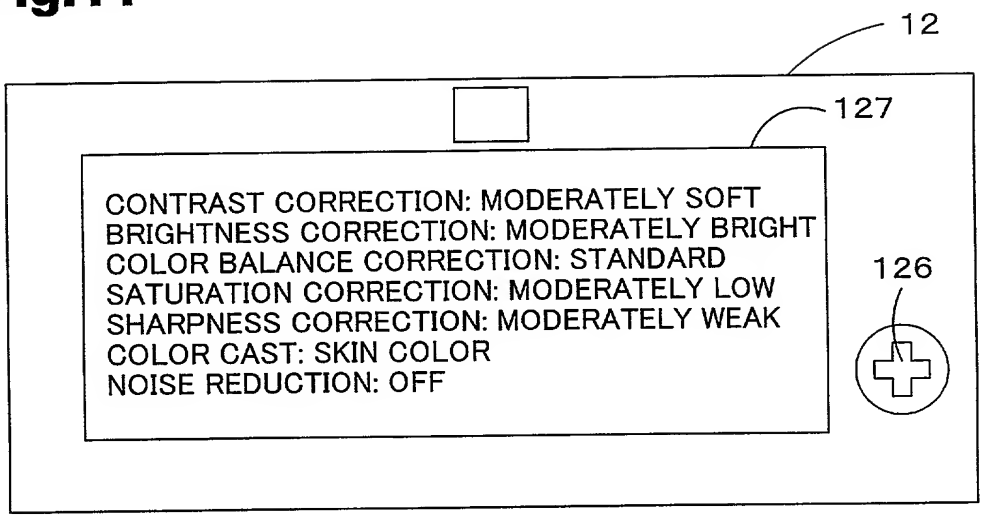
12
127
CONTRAST CORRECTION: MODERATELY SOFT
BRIGHTNESS CORRECTION: MODERATELY BRIGHT
COLOR BALANCE CORRECTION: STANDARD
SATURATION CORRECTION: MODERATELY LOW
SHARPNESS CORRECTION: MODERATELY WEAK
COLOR CAST: SKIN COLOR
NOISE REDUCTION: OFF
126

Fig.12

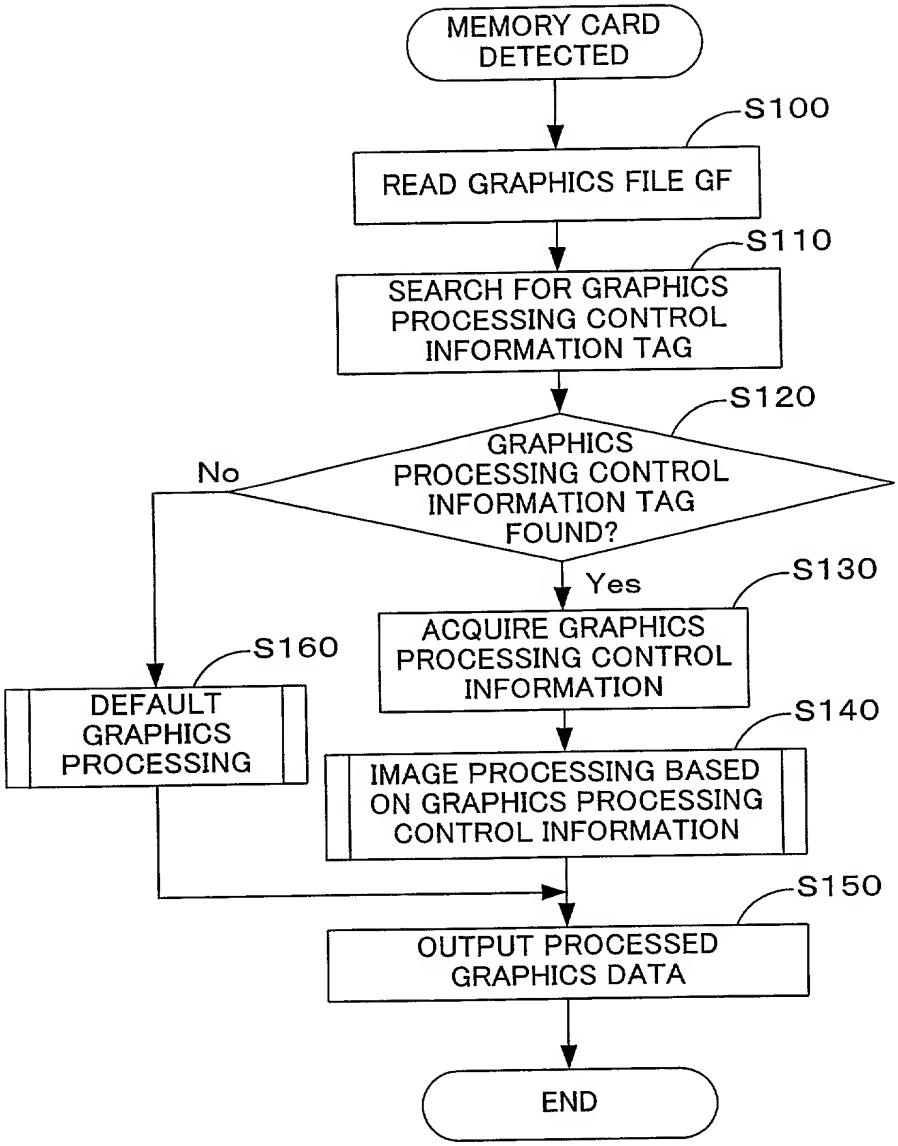
MEMORY CARD DETECTED
S100
READ GRAPHICS FILE GF
S110
SEARCH FOR GRAPHICS PROCESSING CONTROL INFORMATION TAG
S120
GRAPHICS PROCESSING CONTROL INFORMATION TAG FOUND?
No
Yes
S130
ACQUIRE GRAPHICS PROCESSING CONTROL INFORMATION
S140
IMAGE PROCESSING BASED ON GRAPHICS PROCESSING CONTROL INFORMATION
S160
DEFAULT GRAPHICS PROCESSING
S150
OUTPUT PROCESSED GRAPHICS DATA
END

Fig.13

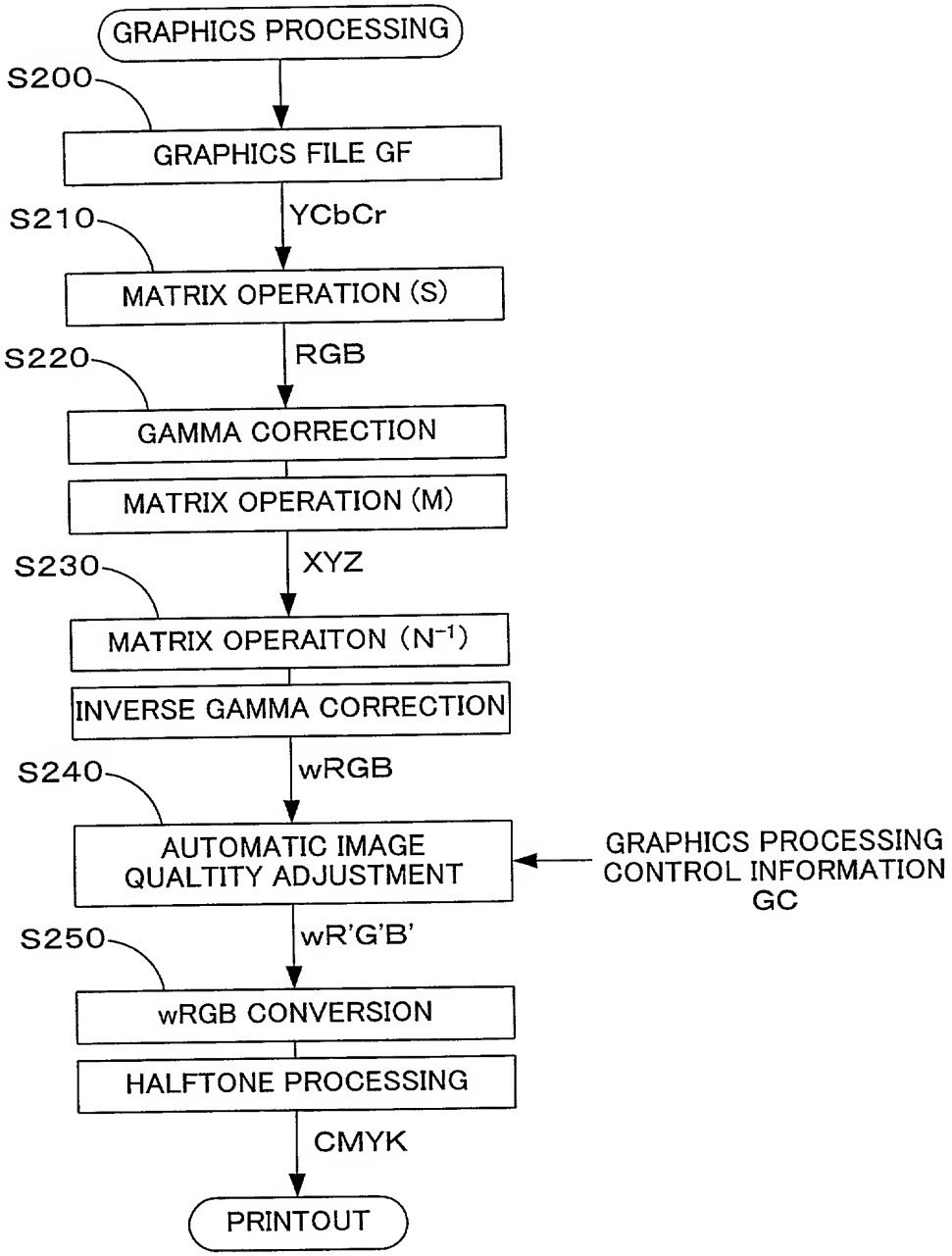
GRAPHICS PROCESSING
S200
GRAPHICS FILE GF
YCbCr
S210
MATRIX OPERATION (S)
RGB
S220
GAMMA CORRECTION
MATRIX OPERATION (M)
XYZ
S230
MATRIX OPERAITON (N-1)
INVERSE GAMMA CORRECTION
wRGB
S240
AUTOMATIC IMAGE QUALTITY ADJUSTMENT
GRAPHICS PROCESSING CONTROL INFORMATION GC
wR'G'B'
S250
wRGB CONVERSION
HALFTONE PROCESSING
CMYK
PRINTOUT

Fig.14

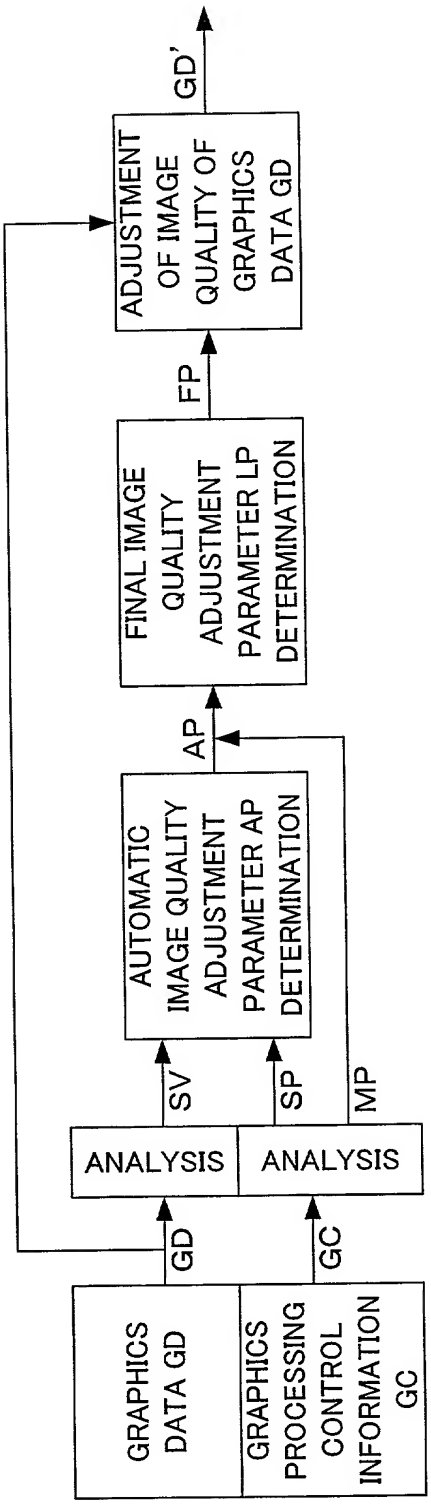
GRAPHICS DATA GD
GRAPHICS PROCESSING CONTROL INFORMATION GC
GD
GC
ANALYSIS
ANALYSIS
SV
SP
MP
AUTOMATIC IMAGE QUALITY ADJUSTMENT PARAMETER AP DETERMINATION
AP
FINAL IMAGE QUALITY ADJUSTMENT PARAMETER LP DETERMINATION
FP
ADJUSTMENT OF IMAGE QUALITY OF GRAPHICS DATA GD
GD'

Fig.15

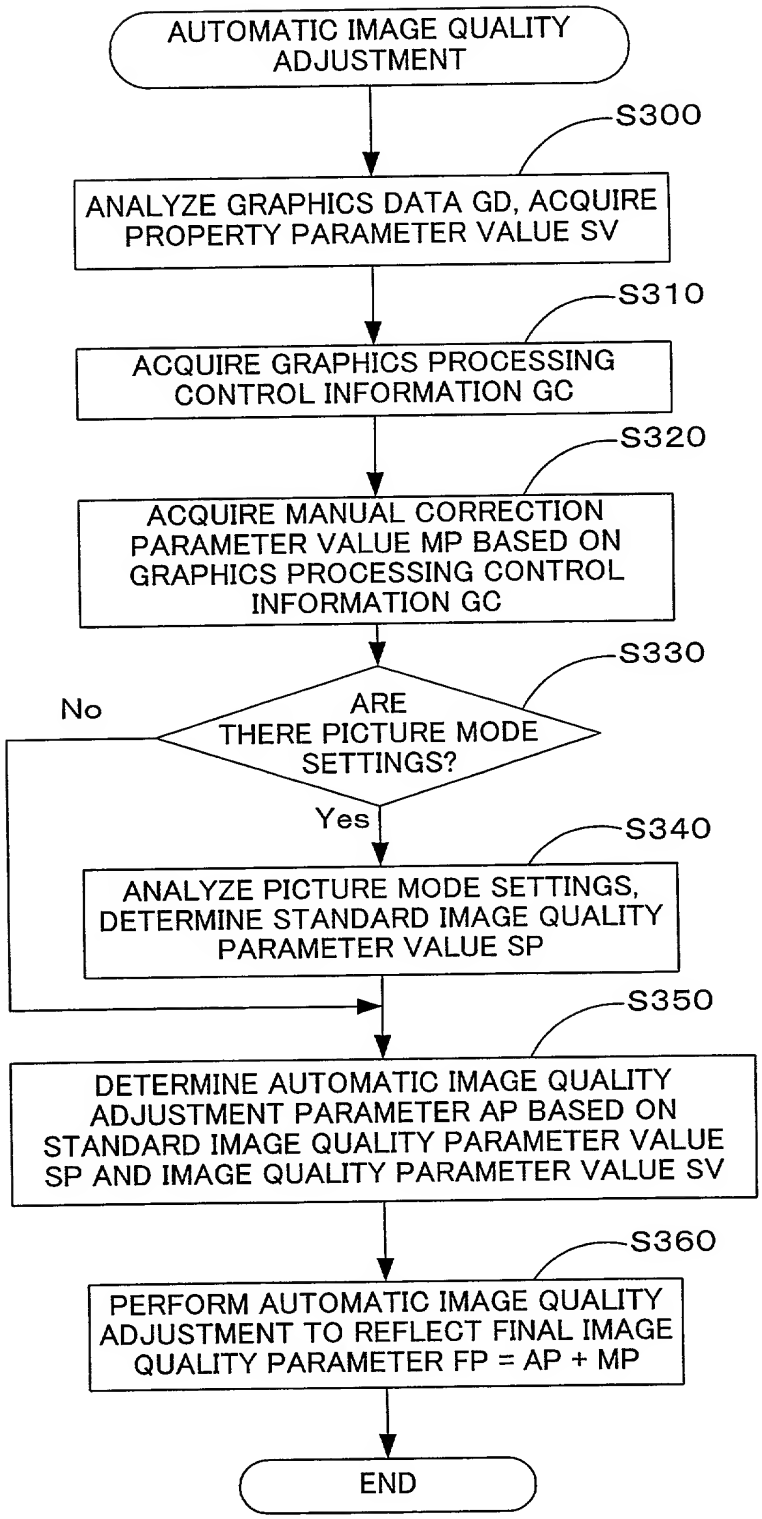
AUTOMATIC IMAGE QUALITY ADJUSTMENT
S300
ANALYZE GRAPHICS DATA GD, ACQUIRE PROPERTY PARAMETER VALUE SV
S310
ACQUIRE GRAPHICS PROCESSING CONTROL INFORMATION GC
S320
ACQUIRE MANUAL CORRECTION PARAMETER VALUE MP BASED ON GRAPHICS PROCESSING CONTROL INFORMATION GC
S330
ARE THERE PICTURE MODE SETTINGS?
No
Yes
S340
ANALYZE PICTURE MODE SETTINGS, DETERMINE STANDARD IMAGE QUALITY PARAMETER VALUE SP
S350
DETERMINE AUTOMATIC IMAGE QUALITY ADJUSTMENT PARAMETER AP BASED ON STANDARD IMAGE QUALITY PARAMETER VALUE SP AND IMAGE QUALITY PARAMETER VALUE SV
S360
PERFORM AUTOMATIC IMAGE QUALITY ADJUSTMENT TO REFLECT FINAL IMAGE QUALITY PARAMETER FP = AP + MP
END

Fig.16

MODE	CONTRAST	BRIGHTNESS	COLOR BALANCE	SATURATION	SHARPNESS	COLOR CAST	NOISE REDUCTION
1	STANDARD	STANDARD	STANDARD	STANDARD	STANDARD	OFF	OFF
2	MOD. SOFT	MOD. BRIGHT	STANDARD	MOD. LOW	MOD. LOW	SKIN COLOR	OFF
3	MOD. HARD	STANDARD	STANDARD	MOD. HIGH	MOD. HIGH	SKY/GREEN	OFF
4	STANDARD	DARK	OFF	STANDARD	MOD. LOW	RED	ON
5	STANDARD	DARK	OFF	STANDARD	STANDARD	OFF	ON
6	MOD. SOFT	MOD. BRIGHT	WEAK	MOD. HIGH	STANDARD	GREEN	OFF
7	STANDARD	STANDARD	WEAK	STANDARD	HIGH	OFF	OFF
8	HARD	STANDARD	STANDARD	MOD. HIGH	HIGH	OFF	OFF
9	MOD. SOFT	BRIGHT	STANDARD	STANDARD	STANDARD	OFF	OFF
10	STANDARD	STANDARD	STANDARD	HIGH	MOD. HIGH	OFF	OFF
11	STANDARD	MOD. BRIGHT	STANDARD	STANDARD	MOD. HIGH	SKIN COLOR	OFF

Fig.17

IMAGE QUALITY PARAMETER	AP	MP	FP	FP'
BRIGHTNESS	16	10	26	42
SHARPNESS	5	−10	−5	0

Fig.18

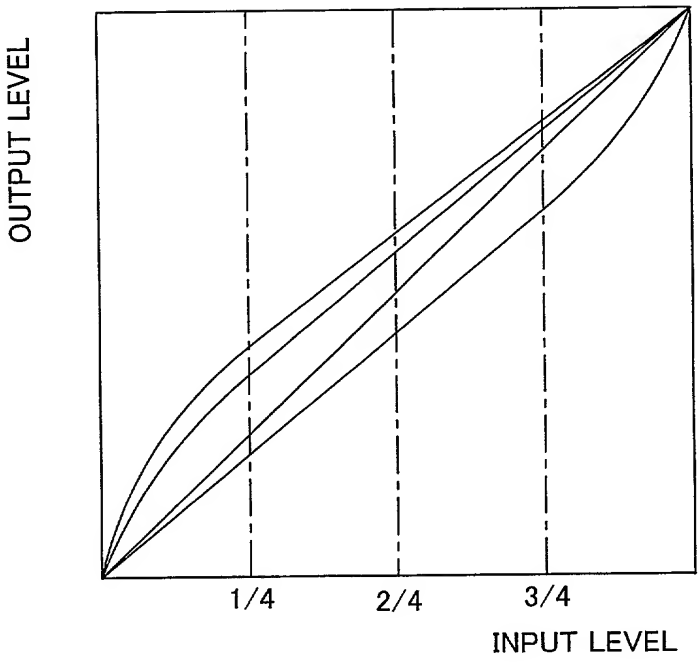

Fig.19

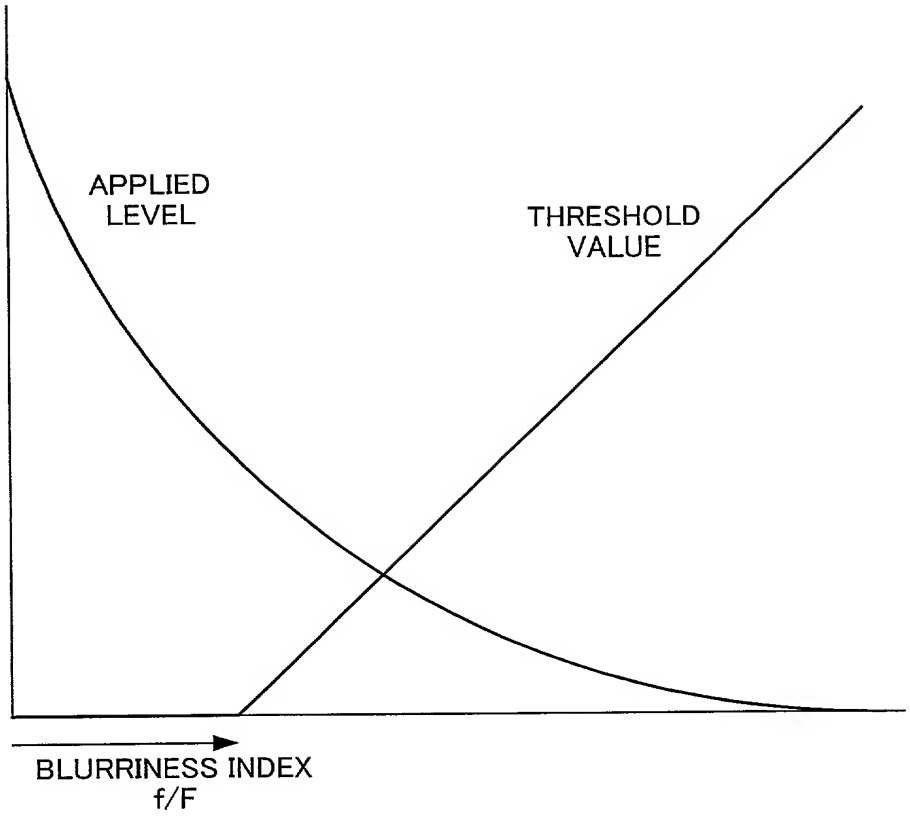

Fig.20

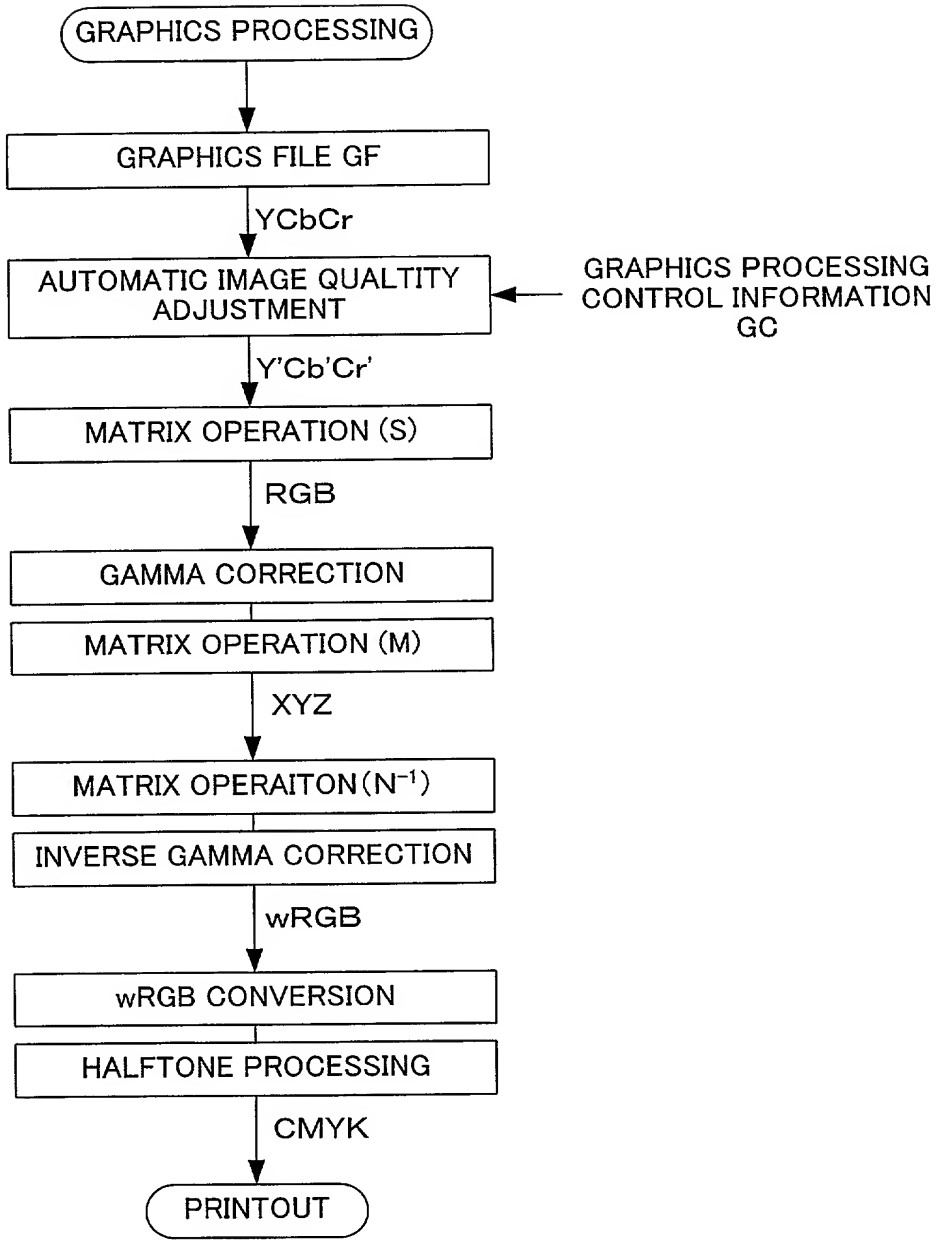
GRAPHICS PROCESSING
GRAPHICS FILE GF
YCbCr
AUTOMATIC IMAGE QUALTITY ADJUSTMENT
GRAPHICS PROCESSING CONTROL INFORMATION GC
Y'Cb'Cr'
MATRIX OPERATION (S)
RGB
GAMMA CORRECTION
MATRIX OPERATION (M)
XYZ
MATRIX OPERAITON (N^{-1})
INVERSE GAMMA CORRECTION
wRGB
wRGB CONVERSION
HALFTONE PROCESSING
CMYK
PRINTOUT

Fig.21

$$\begin{pmatrix} R \\ G \\ B \end{pmatrix} = S \begin{pmatrix} Y \\ Cb-128 \\ Cr-128 \end{pmatrix}$$

$$S = \begin{pmatrix} 1 & 0 & 1.40200 \\ 1 & -0.34414 & -0.71414 \\ 1 & 1.77200 & 0 \end{pmatrix}$$

Fig.22

$$\begin{pmatrix} X \\ Y \\ Z \end{pmatrix} = M \begin{pmatrix} Rt' \\ Gt' \\ Bt' \end{pmatrix} \qquad M = \begin{pmatrix} 0.6067 & 0.1736 & 0.2001 \\ 0.2988 & 0.5868 & 0.1144 \\ 0 & 0.0661 & 1.1150 \end{pmatrix}$$

$Rt, Gt, Bt \geqq 0$

$$Rt' = \left(\frac{Rt}{255}\right)^{\gamma} \qquad Gt' = \left(\frac{Gt}{255}\right)^{\gamma} \qquad Bt' = \left(\frac{Bt}{255}\right)^{\gamma}$$

$Rt, Gt, Bt < 0$

$$Rt' = -\left(\frac{-Rt}{255}\right)^{\gamma} \qquad Gt' = -\left(\frac{-Gt}{255}\right)^{\gamma} \qquad Bt' = -\left(\frac{-Bt}{255}\right)^{\gamma}$$

Fig.23

$$\begin{pmatrix} Rw \\ Gw \\ Bw \end{pmatrix} = \mathrm{N}^{-1} \begin{pmatrix} X \\ Y \\ Z \end{pmatrix}$$

$$\mathrm{N}^{-1} = \begin{pmatrix} 3.30572 & -1.77561 & 0.73649 \\ -1.04911 & 2.1694 & -1.4797 \\ 0.0658289 & -0.241078 & 1.24898 \end{pmatrix}$$

$$Rw' = \left(\frac{Rw}{255}\right)^{1/\gamma} \qquad Gw' = \left(\frac{Gw}{255}\right)^{1/\gamma} \qquad Bw' = \left(\frac{Bw}{255}\right)^{1/\gamma}$$